# Ulysses Out-of-Ecliptic Observations of Interplanetary Shocks

M I: Burton, 1 : J Smith, M Neugebauer, and B I: Goldstein (Jet Propulsion I aboratory, California Inst it ute of Technology, 4800 Oak Grove Drive, Mail Stop 169-506, Pasadena, CA 91109; tel 818-354-7375; e-mail jplsp::mburton)

A Balogh and R J Forsyth (Imperial College, Space. and Atmospheric Physics, The Blackett Laboratory, London, England, SW72BZ)

S J Bame (1 os Alamos National Laboratory, Group 11 SS-8, Mail Stop D438, Los Alamos, NM 87545)

Ulysses has reached a heliographic latitude of more than 40°, greater than any other spacecraft, It is, therefore, in a unique position to make. out-of-ecliptic observations of interplanetary shocks. A large number of shocks have been observed dining the approximately 18-month interval since Ulysse s left the ecliptic plane. Many forward-reverse shock pairs associated with the interaction of solar wind streams have been observed and the number of rc.verse shocks has apparently increased significantly as Ulysses has climbed in latitude. Wc report here on analysis of shocks identified at Ulysses using both magnetic field and plasma data. The results will be compared with theories (e.g., Siscoe, 1976; Pizzo, 1982) emphasizing the three-dimensional aspects of interplanetary shocks.

1. 1993 Fall Meeting

2. 001 22240

3. (a) M I: Burton
   Jet Propulsion I aboratory
   4800 Oak Grove I Drive
   M/S 169-506
   Pasadena, CA 91109

   (b) 818-354-7375

   (c) 818-354-8895

4. s] 1

5. (a) SI 101 Ulysses Solar Wind Results
   (b) 2134,2139,2164

6. N/A

7. 10% at 1993 lAGA Meeting

8. Charge $50 to VISA
   4024-0046-3558-2.394"
   I:xp. 4/94

9. C

10. N/A